

and away the best in existence, and together with the governors of the college they have ensured a debt of gratitude which it will take generations to repay.

In the pages of this volume the student will find records of structures and relationships undreamt of in the text-books, unrecorded in the best monographs; and it is a pity that he is not informed of this. The work is a positive storehouse of new facts and intensely interesting details, and will be of inestimable value to zoologists at large.

A TEXT-BOOK OF MAMMALS.

Text-book of Zoology, treated from a Biological Standpoint. Part I., Mammals. By O. Schmeil. Translated by R. Rosenstock, and edited by J. T. Cunningham. 8vo. Pp. vii + 138, illustrated. (London: A. and C. Black, 1900.)

AS stated in the first title-page, this book is intended for the use of schools or colleges, forming, in fact, a portion of the series of School Text-books now in course of issue by the publishers. It is, therefore, essential that it should be written in a popular and attractive style, and also that it should be absolutely accurate and up-to-date, both as regards the facts recorded, and, so far as possible, in nomenclature. So far as this first item is concerned, the present fasciculus appears to fulfil the required conditions fairly well, the anatomical details being treated in a manner which renders them of easy apprehension by the student, while the descriptions of the animals themselves are, if anything, written in a too popular style. The plan adopted is to take a more or less typical member of a group for special treatment, and then to refer to the kindred forms in a more general manner. Illustrations are numerous; and while many of them are excellent, others, especially the cut of a family of oranges on p. 19, can only be described as hideous caricatures. In a book written primarily for German students, it must be inevitable that the animals of the Fatherland come in for a fuller share of notice than would have been the case had it been the product of an English author, but this is a fault of no special importance.

When, however, we come to the second essential feature of an elementary text-book—accuracy as regards facts, classification and nomenclature—we are bound to confess that the fasciculus before us fails lamentably. Indeed, its appearance is almost a calamity for zoological science in England, since the student who intends to pursue the subject seriously will have much to unlearn; and even for those who only desire a smattering of the subject, it is most important that they should become acquainted with animals by their proper titles, and that what they are taught as facts should really be such. In his preface the editor tells us that he has practically restricted his task to comparing the translation with the original, correcting the proofs, making here and there emendations in detail where a statement seemed open to doubt, or where differences between the faunas of Britain and Germany had to be indicated. For the sake of his own reputation it is a pity that he did not compare the work in detail with a standard English treatise on mam-

mals, when he could scarcely have failed to detect some of the shortcomings of the original text, despite the fact that all the English treatises on the subject are now more or less out of date.

As regards the general classification of the group, although this differs to a certain extent from the one generally adopted in this country, we have no comment to make, except that for some unaccountable reason the order Sirenia is totally omitted, while there appears to be no mention of the animals by which it is represented anywhere in the text!

Turning to some of the ordinal groups, we find the orang taken as a typical representative of the apes, and rightly named *Simia satyrus*. Naturalists will, however, be considerably surprised to see the chimpanzee (p. 22) assigned to the same genus (*Simia*), whereas the gorilla is made the type of a genus by itself; since if there is one well-established zoological fact, it is the intimate relationship existing between the chimpanzee and the gorilla, and the wide gulf separating both from the orang. Again, under the heading of the Platyrrhine apes, there is no reference to the marmosets, and we quite fail to find a reason for the statement (p. 22) that the howling monkeys are the best known members of that group. In treating of the Lemuroids, the author departs from his rule of selecting one species for special notice, and the space allotted to the group is ludicrously inadequate.

As an instance of careless writing we may refer to the notice of the tiger (p. 33), when, after stating that this animal is found in Amurland and Central Asia, the author proceeds to say that its "favourite haunts are swampy districts of the tropical zone, thickly overgrown with bamboo and similar bushes." Again, on p. 84 we find *Cricetus frumentarius* alluded to as "the marmot or hamster," although the true marmots are noticed in an earlier page. Passing on to p. 105, we meet with the statement that the Indian buffalo is said to exist in a wild state in the "East Indies"; while the European bison is stated to be extinct, although on an earlier page (98) its existence in Lithuania and the Caucasus is alluded to! Although we do not propose to notice in detail the hopelessly obsolete generic and specific nomenclature adopted, the statement on p. 106 that "the best-known African antelope is the gazelle (*Antilope dorcas*)" is, however, too ludicrously absurd and incorrect to be passed over. And as a second instance of incorrect nomenclature we may refer to the inclusion of the roe (p. 108) in the same genus as the red deer, from which the fallow deer is excluded. And in this connection it may be mentioned that the editor, who has been recently writing on deer antlers, should have been aware that the brow-tine is not developed in those of the roe.

Before leaving the Placentals, it may be mentioned that the practice of reckoning the carnassial teeth of the land Carnivora as distinct alike from the molar and premolar series is not calculated to give the student an idea of the homology of the cheek-teeth throughout the class. And we also venture to think that the statement on page 37, that "in its dentition the wolf very nearly resembles the cat," in spite of the subsequent qualification that the number of teeth is greater, scarcely accords with the facts.

In the definition of the Marsupials, exception must be taken to the statement that the young are *always* nourished in a pouch; and when mentioning the occurrence of the group in America no reference is made to *Caenolestes*. Indeed, the account of the whole group is entirely inadequate; and when the author speaks of the value of American opossum fur, we strongly suspect he had in his mind the product of the so-called opossums of Australia.

Finally, when treating of the Monotremes, the author states that the spiny anteaters are represented solely by *Echidna hystrix* and *E. setosa*. As a matter of fact, these two forms are but local races of a single species whose name is *E. aculeata*; and the author appears to be totally unacquainted with the very distinct genus commonly known as *Proechidna*!

As already said, we do not intend to criticise in detail the nomenclature employed; but in the retention of names now discarded by those who have made a special study of the class the author has done his best to put his work out of touch with the present state of science.

In making this statement, we are aware that the author lays stress on the circumstance that he is treating his subject from a biological standpoint. This, however, in our opinion, is no excuse for neglect of the details of classification and nomenclature.

When treating of the adaptation of animals to their environment, the author is always interesting; and the paragraphs devoted to this part of the subject are, to our mind, the best in the whole fasciculus. R. L.

GOOD AND BAD AIR.

The Carbonic Anhydride of the Atmosphere. By Prof. E. A. Letts, D.Sc., Ph.D., and R. F. Blake, F.I.C., F.C.S., "Scientific Proceedings of the Royal Dublin Society," vol. ix. (N. S.), Part ii. No. 15. Pp. 270. (Dublin: 1900.)

The Air of Rooms. By Francis Jones, F.R.S.E., F.C.S. Pp. 59. (Manchester: Taylor, Garnett, Evans and Co., 1900.)

THE first of these pamphlets would amply justify its publication, if it only served to emphasise the necessity of further investigation into the methods of estimating carbon dioxide in the atmosphere. It is partly experimental, partly bibliographical in character. The authors, finding themselves called upon to make a series of observations on the carbon dioxide of the air, have made a careful study of Pettenkofer's method, and have introduced some necessary corrections, without detracting very much from its simplicity. They take the precaution, suggested by other observers, of preventing the action of the baryta solution on the glass by coating the vessel with a layer of paraffin wax. It may be pointed out that a solution in benzene is more suitable than the melted wax. The thinner film obtained with the solution is less liable to crack. The baryta solution is manipulated very ingeniously out of contact with air. Yet with all these precautions the results show that perfection is far from being attained.

In the set of analyses on page 132 there is a discrepancy between the highest and lowest figures of 10 per

cent., in another set on the same page the difference amounts to 17 per cent., and on the next page to 20 per cent.

It seems superfluous to introduce the third decimal into the result when the experimental error affects the first decimal place, and equally unnecessary to make a correction for aqueous vapour, which only amounts to about one and a half per cent. on the volume of carbon dioxide, as against 10 per cent. or thereabouts from experimental error.

The authors omit to mention how long the baryta remains in contact with the sample of air. This is an important factor which should not be neglected, for there can be no doubt that the absorption of carbon dioxide by the baryta proceeds at a rapidly decreasing rate and that the final traces of the gas may take many hours to disappear.

The book is full of useful information, drawn from a variety of sources, the collection of which must have cost the authors no little trouble. At the same time, one is inclined to think that the value of the information would have been enhanced if they had gone another step and made a critical selection from the mass of analyses which they reproduce, for the figures cannot all be equally trustworthy, and many of them must be entirely illusive.

The second pamphlet relates to domestic hygiene. It treats of the effects produced on the air of rooms by the use of gas, coal and electric light for heating and lighting purposes. The effect is determined by estimating the amount of carbon dioxide by Pettenkofer's method, and by exposing a layer of permanganate solution to the air and finding the quantity of the salt reduced.

Mr. Jones, unlike the authors of the previous pamphlet, is not troubled by misgivings about Pettenkofer's method, except in the matter of the baryta attacking the glass. He therefore substitutes lime-water as the absorbent, apparently unaware of the fact that its effect on glass is precisely of the same character, which may be easily observed by placing very dilute lime-water coloured with phenolphthalein in any glass vessel; in a day or two the colour will be completely discharged. As the results here are only required for comparison, great accuracy is not requisite, and the ordinary method may be relied on. The results of the permanganate method will scarcely serve to recommend it. We find, for example, that in two experiments made on July 21 two-thirds the quantity of permanganate was reduced in the one case in double the time. As Mr. Jones points out, the quantity of dust may affect the rapidity of reduction. If this is the case, effective ventilation will produce disturbance of the air and movement of dust as well as local currents from gas-jets, and it will be difficult to differentiate the two. The results which Mr. Jones obtains are precisely what might be anticipated if we take into account the fact that a coal fire produces an enormous air current through a room near the floor level, whereas a gas fire usually only serves to carry away its own products of combustion. Mr. Jones finds that the purest atmosphere is maintained with a coal fire and electric light; then follow gas fire with electric light, coal fire and gas light, and gas fire and gas light. The worst effect is produced by an open gas cooking stove without flue. The author shows, moreover, that